Table 2.—*Showing the monthly averages of barometric pressures, temperature, and rainfall at Basseterre, St. Kitts, together with the average number of days on which .01 inch, or more, of rain fell; an average rain (average amount divided by average number of days), and total number of days with 2.50 inches or over. The averages are based on periods of years as indicated at top of each column.*

Months.	Average monthly—			Average No. days with .01 inch or more of rainfall (8 years).	An average rain.	Total No. of days with—	
	Barometric pressure (35 years).	Temperature (35 years).	Rainfall (44 years).			2.50, but less than 5.00 inches of rain (44 years).	5.00 inches or more of rain (44 years).
January........	29.99	78.1	3.66	16	.23	1	1
February........	30.00	78.3	1.89	14	.14	1	0
March	29.99	78.9	2.07	11	.19	0	0
April	29.98	80.2	3.32	11	.30	5	0
May	29.97	81.5	4.18	15	.28	7	1
June	30.01	82.6	4.00	17	.23	1	0
July	30.00	83.1	4.46	19	.23	2	1
August	29.97	83.8	5.67	18	.32	7	2
September	29.94	83.9	6.45	18	.36	7	2
October	29.93	83.3	6.54	16	.41	7	2
November	29.92	81.9	5.35	16	.33	4	1
December.......	29.96	79.9	3.78	15	.25	2	1

RAINFALL IN CENTRAL AND WESTERN NICARAGUA.

By Earl Flint, dated December 13, 1899.

In selecting records of rainfalls I find only three reliable ones, taken at the cities of Masaya, Granada, and Rivas during a period of eleven years, from 1886 to 1896, and giving a mean rainfall of 61 inches and a fraction, including three maximum records at Rivas. The mean fall at the latter city for a period of nineteen years is 68.09 inches, including the abnormal rains in the years 1897 and 1898. I hold the belief that henceforth if records be taken throughout the state the mean fall will be found to be less than 61 inches.

I noted a decrease of the rainfall in 1863, and many old residents had noted the same, which fact was confirmed by the drying of the marshes north of Granada and of the Tipitapa Falls, occurrences not previously remembered. In that year in going around the lake to Talolinga I passed above the outlet of Tipitapa on my way across to Managua. I noticed neither a change in temperature nor a sign of subterranean outflow. What, then, but a slight rainfall would account for the above said decrease? There were no records kept, only the observations made by intelligent citizens. At that time Mr. Espinola brought a rain gage and kept records until 1877. I did not send any complete record until charts and forms were sent for the simultaneous international observations of the Signal Service, now succeeded by those of the Washington Weather Bureau. These I have forwarded complete.

In 1875, during my correspondence with Professor Baird, I again called his attention to the continued closure of the outflow at Tipitapa, which he attributed to a subterranean outlet, while I thought it was due to light rains. Without any records for reference I could only rely on observations of others, aided by personal ones, made on the north and northeast watersheds of Lake Nicaragua. When I went to La Libertad I saw verified the decreased supply that I had foretold, due to deforesting the source of the streams supplying the native arrastras. This water power was soon abandoned for steam power. On the Rivas plateau several small streams which used to run throughout the year are now dry, save in years of maximum rainfall.

In this way I accounted for the great accumulation of detritus at San Carlos, at that time impeding navigation at the entrance of the river. I then asserted to Professor Baird that its continued deposit would within a quarter of a century block the outlet in the dry season, of course counting out the supply of water from Lake Managua, and a diminishing rainfall. The deposit kept on increasing until the outflow at Tipitapa was renewed in 1878. It yet closed again two years between 1881 and 1890. The exact date Mr. J. Vasconcelos, an old resident, could not remember, yet he asserts its closure in 1891 and in 1892, Mr. J. L. Talavera and Mr. William Climie, C. E., confirming the same in 1896.

Should the outlet again close for a series of years, an event more than probable in view of the increasing cultivation along the streams and the sources which now feed the lakes, this would diminish the supply necessary for the proposed canal to connect the lakes and render the canal useless in the dry season, excepting during maximum rainfalls on the watershed. At an early date I suggested the union of the Sebaco rivers so as to increase the supply necessary for the main canal, which supply must, in my opinion, be attended to early, before the augmenting commerce will require more than double the quantity of water necessary when the canal is first finished. This union, according to Mr. Masey, could be done at a small cost.

By replanting the arid plateaus north and east of the lake, selecting trees of the most useful kind, the evaporation already noted would be diminished to at least 50 per cent, it would tend to keep the rivers from drying up to a great extent in the dry season. By this method the object aimed at will be obtained over the country drained by both lakes, that is to say over an area of about 15,000 square miles, much of it mountainous.

If these conservative measures are not adopted we may in a few years see Lake Managua standing below its present outlet as an isolated inland lake.

Judging from past observations we may expect soon to see a repetition of the closure of 1863, since there are this year many corresponding meteorological phenomena: First, the prolonged northeast winds that always check abundant rainfalls, so that now, as then, the crops have suffered in the eastern section of the state; second, in 1861 fell the heaviest rainfall since 1825, thus allowing a large lake steamer to come up from Greytown in two and a half days, passing all the rapids with ease. The year 1899 has been preceded by the maximum of 1897 and 1898, the two greatest in twenty years, the latter nearly double that at Tipitapa, whose light outflow this year is due to *excessive* rainfalls about the head of the lake, yet we fear its closure in 1900 for a series of years as in 1863.

TABLES OF DEW-POINT OBSERVED AT HONOLULU.

By Curtis J. Lyons, dated August 19, 1899.

In communicating the following tables of dew-point, Mr. Lyons says:

I would venture to suggest that one enter the humidity tables with the average temperature of the month and the average dew-point and take out the required average humidity. For instance, San Francisco, with a mean temperature of 55.1° and a mean dew-point of 47.5° for 1897 (see Annual Report of the Weather Bureau), would have a mean relative humidity of 74.5°, whereas the published mean is 79.5° from the mean of the 8 a. m. and 8 p. m. observations. The humidity at Honolulu derived from 9 a. m. and 9 p. m. local observations and verified by the method above mentioned is 72 per cent. I have found the above method to generally give about the same result for the same hours, and for this reason I have used the above hours (9 a. m. and 9 p. m., local time) for the past eight years.

The dew-point here is an important item in endeavors to predict weather changes. A fall of the dew-point during trade-wind weather is almost always followed within from twenty-four to thirty-six hours by showers, not cyclonic rains, but the common trade-wind shower, is probably caused by the interpenetration of northerly upper currents. Probably the northern currents are caused by distant lows passing north of this place.

[The annual mean temperature of 55.1° used by Mr. Lyons in the example above cited was derived from the daily extremes and differs by 1.3° from the annual mean derived from observations at 8 a. m. and 8 p. m. Entering the humidity

tables with the proper mean temperature, viz, 53.8°, and mean dew-point, 47.5°, one gets for the humidity 79.8 per cent, which agrees with the published mean within less than one-half of one per cent.

The monthly means of the dew-point, relative humidity, and vapor pressure are given in the annual volumes as computed directly from the daily observations.—A. J. H.]

Annual record of observations for dew-point only during 1898, by Curtis J. Lyons, at Honolulu,

Lat. 21° 18', long. 157° 50'; ground above sea, 43 ft; thermometer above ground, 9 ft.

Day of month	January A.M. 6:00	9:00	P.M. 2:00	9:00	February A.M. 6:00	9:00	P.M. 2:00	9:00	March A.M. 6:00	9:00	P.M. 2:00	9:00
1	60	62	67	64	62	66	66	66	58	54	56	57
2	66	66	61	63	66	70	67	70	55	59	*40	50
3	57	61	64	63	68	69	67	61	52	52	52	54
4	62	65	63	62	57	61	64	61	57	60	58	57
5	61	61	61	61	55	61	62	66	57	56	56	57
6	62	63	66	64	58	65	68	63	61	59	59	58
7	63	64	64	65	59	64	68	64	59	58	58	59
8	61	65	64	59	59	66	63	59	58	61	61	61
9	58	63	63	60	62	68	68	64	59	61	62	59
10	59	63	64	63	60	66	66	62	62	62	63	61
11	61	63	65	64	66	68	69	67	61	62	62	60
12	60	63	65	63	61	61	64	62	63	65	62	63
13	56	65	65	67	61	62	64	59	68	68	66	67
14	62	64	67	64	55	55	59	57	67	70	68	68
15	61	63	61	59	[57]	58	62	57	68	69	69	68
16	61	61	66	64	58	62	65	62	68	69	70	71
17	59	65	66	68	63	67	66	66	68	69	71	69
18	59	63	67	61	64	70	68	64	68	69	68	66
19	66	67	68	64	65	66	67	62	68	69	68	68
20	61	67	69	67	[64]	65	66	67	67	69	66	66
21	59	67	67	69	[67]	69	64	65	66	66	62	64
22	64	67	67	64	62	62	63	61	66	64	65	63
23	64	62	64	61	63	68	68	66	66	64	64	64
24	61	64	66	63	67	66	61	63	63	63	62	62
25	59	62	62	62	64	67	66	61	63	62	64	62
26	64	67	67	67	58	59	58	53	64	64	65	65
27	61	63	63	62	55	58	62	55	67	65	66	66
28	59	58	59	59	54	50	55	53'	63	63	63	62
29	60	61	63	60	......	......	......	......	61	59	61	60
30	56	59	62	60	......	......	......	......	60	59	61	60
31	61	63	63	66	......	......	......	......	57	59	59	57
Means	60.7	63.6	64.5	63.0	61.0	63.9	64.1	62.0	62.7	62.9	62.1	61.7
Monthly m's	62.9				62.5				62.3			

Day of month	April A.M. 6:00	9:00	P.M. 2:00	9:00	May A.M. 6:00	9:00	P.M. 2:00	9:00	June A.M. 6:00	9:00	P.M. 2:00	9:00
1	58	57	57	59	66	66	64	62	63	63	62	65
2	59	56	59	59	63	63	64	65	63	65	64	64
3	58	59	59	60	66	66	65	64	66	63	63	66
4	59	56	58	60	63	62	64	64	63	63	63	63
5	59	59	58	60	64	63	62	65	62	63	61	63
6	57	57	58	59	66	67	62	62	64	64	66	64
7	58	58	62	62	64	62	65	63	65	64	68	68
8	59	59	60	61	61	60	59	61	69	69	69	66
9	62	62	61	62	65	63	64	62	66	67	66	65
10	62	61	62	61	61	62	60	63	66	68	65	65
11	62	62	63	62	63	63	61	62	63	62	62	64
12	65	63	63	64	65	63	62	63	64	63	64	63
13	63	62	62	62	61	61	60	60	64	66	65	66
14	63	63	63	61	61	61	60	60	65	65	62	63
15	63	63	64	63	65	67	61	63	67	68	65	67
16	62	60	61	63	63	62	64	64	64	64	65	64
17	63	64	62	63	63	65	65	65	64	66	67	68
18	60	62	61	63	63	62	64	66	66	66	64	64
19	62	61	61	60	62	63	64	64	67	68	66	66
20	61	63	59	62	62	63	64	64	64	62	64	66
21	65	63	62	61	62	62	63	62	65	66	64	67
22	64	64	64	65	62	62	62	62	67	70	73	71
23	65	64	65	65	61	61	61	64	69	70	68	66
24	66	66	65	64	65	64	63	64	66	68	64	63
25	65	65	61	64	68	66	63	68	66	67	67	66
26	64	63	62	64	66	65	66	66	70	69	68	66
27	66	64	63	64	64	65	64	65	65	65	65	63
28	63	67	64	66	66	64	64	63	63	61	64	63
29	66	65	67	66	67	66	64	65	66	62	62	65
30	66	66	65	64	66	66	66	65	64	66	65	67
31	......	......	......	......	64	65	65	......	......	......	......	......
Means	62.2	60.8	61.4	61.9	63.8	63.5	63.4	63.5	65.4	65.4	65.0	65.2
Monthly m'n	61.6				63.5				65.2			

*This extreme is correct.　　Bracketed figures are interpolated.

Annual record of observations for dew-point at Honolulu—Continued.

Day of month	July A.M. 6:00	9:00	P.M. 2:00	9:00	August A.M. 6:00	9:00	P.M. 2:00	9:00	September A.M. 6:00	9:00	P.M. 2:00	9:00
1	66	65	68	67	64	65	66	65	64	66	64	65
2	65	69	70	69	64	64	65	66	63	65	64	65
3	65	66	66	68	65	66	69	69	65	65	64	66
4	67	67	69	67	68	69	67	67	67	65	65	66
5	67	66	65	68	66	66	68	68	65	65	64	65
6	66	65	63	66	69	69	68	68	07	67	67	65
7	66	65	66	66	68	68	69	68	65	64	63	65
8	66	68	66	67	64	65	67	66	67	66	65	65
9	66	64	68	66	65	67	64	66	67	63	64	64
10	68	69	66	65	64	65	66	64	66	67	67	66
11	65	65	67	65	65	55	65	65	66	68	67	65
12	67	67	66	65	69	68	65	65	62	64	64	65
13	65	66	67	66	64	64	63	68	67	70	69	68
14	67	67	69	64	66	64	66	66	64	63	66	67
15	65	65	63	64	67	69	67	69	64	65	67	66
16	64	65	67	67	68	69	69	67	68	67	67	67
17	68	70	68	68	68	68	65	64	65	65	63	66
18	68	64	65	67	66	67	63	63	65	65	65	66
19	66	66	66	67	61	61	62	63	65	66	66	65
20	66	64	66	67	64	64	64	66	65	66	64	66
21	64	67	69	69	65	67	67	67	67	64	65	68
22	07	66	68	66	64	65	67	69	65	62	66	67
23	66	66	68	68	64	65	67	65	65	64	66	64
24	68	66	66	66	64	66	66	68	69	64	64	66
25	64	66	65	66	65	66	66	66	65	64	68	64
26	64	65	65	65	66	63	64	64	65	68	69	67
27	65	65	64	66	66	65	63	65	67	68	68	69
28	64	65	65	65	64	71	65	64	65	68	70	69
29	66	64	65	69	65	65	67	64	68	68	68	65
30	68	68	69	68	64	68	66	65	67	68	66	68
31	68	68	69	68	65	65	66	65	68	65	67	63
Means	65.9	66.1	66.6	66.5	65.4	66.1	65.9	66.0	65.5	65.5	65.6	65.9
Monthly m'n	66.3				65.8				65.6			

Day of month	October A.M. 6:00	9:00	P.M. 2:00	9:00	November A.M. 6:00	9:00	P.M. 2:00	9:00	December A.M. 6:00	9:00	P.M. 2:00	9:00
1	66	68	69	67	63	62	64	65	61	64	66	65
2	66	69	67	66	63	63	66	60	62	63	64	66
3	67	66	66	67	63	65	65	65	64	65	63	65
4	67	69	68	67	65	64	64	63	65	65	62	63
5	68	66	67	66	63	61	63	62	62	65	64	66
6	68	66	68	67	65	63	66	64	69	71	70	70
7	69	67	67	68	64	64	64	66	68	69	68	65
8	67	68	66	66	64	65	65	62	62	65	67	56
9	67	67	66	66	66	64	65	63	56	56	55	54
10	66	68	67	66	65	63	63	65	53	55	56	61
11	65	66	67	66	66	65	61	67	60	58	65	64
12	66	66	67	64	64	65	64	68	62	64	66	64
13	63	67	68	68	67	69	67	68	61	64	65	70
14	66	67	66	68	66	67	67	66	67	68	69	66
15	65	65	68	68	61	70	69	66	60	61	61	59
16	68	65	67	65	67	68	66	64	55	56	58	59
17	65	65	65	65	65	66	64	64	59	60	57	62
18	64	64	66	66	65	65	64	64	60	61	64	62
19	64	65	63	65	64	64	65	65	65	66	66	66
20	66	66	65	66	66	68	66	67	62	65	67	64
21	68	68	70	69	65	66	68	67	62	64	65	62
22	70	72	72	73	66	65	64	66	61	62	52	52
23	70	73	74	70	64	67	67	66	55	55	54	57
24	67	70	67	66	63	63	65	66	57	57	57	57
25	71	68	62	65	64	66	63	64	62	63	63	64
26	67	69	67	64	64	63	63	63	62	64	62	63
27	65	65	64	65	62	65	63	63	61	66	65	65
28	67	70	66	65	65	64	63	63	62	67	66	64
29	68	66	62	65	63	62	64	62	58	62	64	62
30	65	61	64	62	62	62	62	62	63	65	63	66
31	......	......	......	......	......	......	......	......	64	65	66	65
Means	66.5	67.0	66.7	66.3	64.6	65.0	64.6	64.4	61.3	63.3	62.9	62.6
Monthly m'n	66.7				64.7				62.5			

Mean dew-point for the year, 64.13° F.

THE WEATHER AND THE LIVE STOCK INDUSTRY.[1]

By F. H. BRANDENBURG, Local Forecast Official and Section Director.

Last year I had the pleasure of appearing before you and outlining a plan for promoting a closer relationship between the Weather Bureau of the Department of Agriculture and

[1] The above address was delivered January 18, 1900, at Fort Worth, Tex., at the annual convention of the National Live Stock Association.